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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/647,454

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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT

PAPER NUMBER

1774

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/19/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/647,454

Applicant(s)

KITANO ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 November 2006 and 15 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

1. This Office action is in response to applicant's amendment filed November 20, 2006, which provides a substitute specification, amends claims 1, 3 and 9, and cancels claim 2.

This Office action is also in response to applicant's supplemental amendment filed December 15, 2006, which further amends claim 1.

Claims 1 and 3-24 are pending.

2. The claims remain subject to an election of species. Claims 1 and 3-24 continue to read on the elected species.

3. The objection to the disclosure because of informalities, as noted in the Office action mailed May 19, 2006, is overcome by the substitute specification filed November 20, 2006.

The issue raised under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, with respect to claim 9's recitation of "the above formula (3)" is overcome by claim amendment.

The rejections under 35 U.S.C. 102(b) and 35 U.S.C. 103(a) based on Hsieh (US 5,879,821) are overcome by claim amendment. The limitations of original claim 2 have been incorporated into claim 1. Hsieh did/does not disclose or suggest the limitations of original claim 2.

The rejection under 35 U.S.C. 103(a) based on Yamamoto et al. (US 6,034,206) is overcome by claim amendment filed December 15, 2006. (In the amendment filed November 20, 2006, claim 1 was amended to require "a+b=0" for repeating units of formula (1), and applicant argued that Yamamoto et al. do not meet this limitation and do not disclose or suggest

Art Unit: 1774

the specific carbon position of the substituents as required by the claims. The examiner disagrees with these arguments. A polymer of Yamamoto's formula (3), (7) or (14) that is made with 2,4,6-trimethylaniline or 2,3,4,5,6-pentafluoroaniline (both anilines being disclosed in the prior art) meets the carbon position of the substituents required by claim 1, and meets  $a+b=0$ . However, in the amendment filed December 15, 2006, claim 1 was further amended to require "a+b=1" for repeating units of formula (1). Yamamoto et al. do not disclose or suggest polymers comprising a repeating unit of formula (1) wherein  $a+b=1$  (and do not disclose or suggest polymers comprising a repeating unit of formula (2))).

4. Claims 1, 3, 5, 7, 8 and 11-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, with claims 3, 5, 7, 8 and 11-24 dependent directly or indirectly therefrom, requires selection of a substituted aryl group (A) based on certain calculations. Claim 7, with claim 8 dependent therefrom, requires selection of a substituted aryl group (A') based on certain calculations. Claims 1 and 7 recite "one of the highest...is arbitrarily selected" (emphasis added). It is not clear if the results of the calculations will be the same regardless of which one of the highest occupied molecular orbitals is selected.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3, 5-9 and 11-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kreuder et al. (US 5,814,244).

See the whole patent. In particular, see column 2, line 8-c. 7, l. 33 (especially, the two formulae at c. 6, l. 25-31), c. 17, l. 53-c. 18, l. 29, and the claims.

Kreuder et al. provide for polymers comprising a repeating unit of present formula (1) wherein  $a = 1$  and  $b = 0$ . A polymer of formula (I) according to Kreuder et al. in which  $n$  is 1 and each of  $Ar^2$  and  $Ar^4$  represents a group of the first formula at c. 6, l. 25-31 is a polymer comprising a repeating unit of present formula (1) in which each of  $E_3$  and  $E_1$  represents heterocyclic group (B) as defined in present claim 1. A polymer of formula (I) according to Kreuder et al. in which  $n$  is 1 and each of  $Ar^2$  and  $Ar^4$  represents a group of the second formula at c. 6, l. 25-31 is a polymer comprising a repeating unit of present formula (1) in which  $E_3$  and  $E_1$  represents aryl group (A) as defined in present claim 1 and further defined in present claim 3.

Kreuder et al. do not disclose a specific example of a polymer within the scope of the present claims, and do not limit the number-average molecular weight of the polymers. Kreuder et al. disclose polymers within Kreuder's generic formula (I) having number-average molecular weights within the range set forth in present claim 1. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make other compounds within the scope of Kreuder's generic formula (I), such as polymers in which each of  $Ar^2$  and  $Ar^4$

represents a group of the first or second formula at c. 6, l. 25-31. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum number-average molecular weights for the polymers and, guided by the examples provided by Kreuder et al., would have reasonably expected number-average molecular weights within the range set forth in present claim 1 to be suitable for Kreuder's polymers.

With respect to present claims 5-9, these claims further define variables found in the repeating unit of formula (2), but do not limit the claimed polymer to a polymer comprising a repeating unit of formula (2). Kreuder et al. suggest claims 5-9 as drawn to the polymer of claim 1 comprising a repeating unit of formula (1).

With respect to present claim 11, Kreuder's general formula (I) provides for copolymers comprising a repeating unit of present formula (1) and a repeating unit of present formula (4), (6) or (7) wherein  $Ar_{12}$  represents an arylene group or divalent heterocyclic group, and  $X_2$  represents  $-CR_2=CR_3-$ .

With respect to present claims 12-20, see c. 2, l. 46-52 and c. 17, l. 53-c. 18, l. 25.

Further with respect to present claim 14, Kreuder's examples include the manufacture of an electroluminescent (EL) device by applying a solution of a polymer of Kreuder's general formula (I). Kreuder et al. do not disclose the viscosity of the solution, or limit the viscosity of a solution of the polymer. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for solutions to be used for device fabrication. For example, one of ordinary skill in the art knows that it is easier to form thinner coatings/films with a less viscous solution.

With respect to present claims 21-24, see c. 18, l. 25-29 for example. It was known in the art at the time of the invention to incorporate EL devices into displays such as claimed in present claims 22-24. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate an EL device according to Kreuder et al. in types of displays in which EL devices were known to be useful at the time of the invention.

7. Claims 1 and 3-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woo et al. (US 6,309,763 B1).

See the whole patent. In particular, see column 1, line 32-c. 2, l. 44, c. 4, l. 4-30, c. 10, l. 35-41, c. 11, l. 13-c. 12, l. 14, and claims 1, 2 and 11-16. Note that b in Woo's repeating unit of formula (II), (III) or (IV) may be 3, thus suggesting polymers comprising a repeating unit of present formula (1) wherein  $a=1$ ,  $b=0$ , each of  $Ar_1$  and  $Ar_3$  represents an arylene group, and each of  $E_3$  and  $E_1$  represents aryl group (A) as defined in present claim 1 and further defined in present claims 3, 4 and 10.

Woo's teachings regarding weight average molecular weights and polydispersity at c. 4, l. 15-30 provide for polymers having number average-molecular weights within the range set forth in present claim 1.

Woo et al. do not provide a specific example of a polymer comprising a repeating unit of present formula (1), but such polymers are clearly within the scope of Woo's polymers. Absent a showing of criticality for particular substituents and combinations of substituents for aryl group (A), it is the examiner's position that it would have been within the level of ordinary skill of a

worker in the art at the time of the invention to determine suitable substituted phenyl groups for the (R<sub>3</sub>)<sub>b</sub>-substituted phenyl group(s) of Woo's repeating unit of formula (II), (III) or (IV).

With respect to present claims 5-9, these claims further define variables found in the repeating unit of formula (2), but do not limit the claimed polymer to a polymer comprising a repeating unit of formula (2). Woo et al. suggest claims 5-9 as drawn to the polymer of claim 1 comprising a repeating unit of formula (1).

Regarding present claim 11, Woo's repeating unit of formula (I) is a repeating unit of present formula (4) wherein Ar<sub>12</sub> represents an arylene group.

With respect to present claims 12-24, see c. 10, l. 35-41 and c. 11, l. 13-c. 12, l. 14 for example.

Further with respect to present claim 14, Woo et al. teach that thin films can be formed used a solution comprising the polymer. Woo et al. do not limit the viscosity of such a solution. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for solutions to be used as suggested by the prior art. For example, one of ordinary skill in the art knows that it is easier to form thinner films with a less viscous solution.

Further with respect to present claims 21-24, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate an EL device according to Woo et al. in types of displays in which EL devices were known to be useful at the time of the invention.



Art Unit: 1774

8. Applicant's arguments filed November 20, 2006 have been fully considered but they are not persuasive with respect to the rejections set forth in this action. (The remarks filed December 15, 2006 with the supplemental amendment contain no additional specific arguments with respect to any of the rejections.)

With respect to the issues raised under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, the examiner previously questioned whether "one of the highest" meant "the highest". Based on applicant's arguments, "one of the highest" is not necessarily "the highest". It is not clear to the examiner how the results of the calculations specified in present claims 1 and 7 can be the same regardless of which HOMO is selected. Further clarification is required.

With respect to the rejection under 35 U.S.C. 103(a) based on Kreuder et al., applicant argues that Kreuder does not disclose or suggest any of the substituents defined in claim 1 of the invention. The examiner respectfully disagrees.

The first formula at c. 6, l. 25-31 of the Kreuder patent represents a monovalent heterocyclic group having four substituents, each of the substituents being a halogen atom, wherein the total number of substituents and hetero atoms of the heterocyclic ring is five. The group represented by the first formula at c. 6, l. 25-31 meets the limitations of heterocyclic group (B) as defined in present claim 1, and is taught for Ar<sup>2</sup> and Ar<sup>4</sup> of Kreuder's formula (I). Ar<sup>2</sup> and Ar<sup>4</sup> of Kreuder's formula (I) correspond to E<sub>3</sub> and E<sub>1</sub>, respectively, in a repeating unit of present formula (1) in which b=0 and a=1.

The second formula at c. 6, l. 25-31 of the Kreuder patent represents an aryl group having five substituents, each of the substituents being a halogen atom. Since the aryl group is

substituted with the maximum number of substituents possible for the particular aryl group (a phenyl group), it is the examiner's understanding that condition "(C)" of present claim 1 is inherently met by the group represented by the second formula at c. 6, l. 25-31 of the Kreuder patent. The group represented by the second formula at c. 6, l. 25-31 meets the limitations of aryl group (A) as defined in present claim 1 and further defined in present claim 3, and is taught for  $Ar^2$  and  $Ar^4$  of Kreuder's formula (I).  $Ar^2$  and  $Ar^4$  of Kreuder's formula (I) correspond to  $E_3$  and  $E_1$ , respectively, in a repeating unit of present formula (1) in which  $b=0$  and  $a=1$ .

Applicant further argues that Kreuder discloses a general formula (I) and a number of possible substituted or unsubstituted groups. Applicant argues that Kreuder does not suggest the combination of variables to produce a polymer according to the presently claimed invention.

While Kreuder's general formula (I) has nine variables, only three of the variables must be further limited in order to provide polymers comprising a repeating unit of present formula (1):  $Ar^2$ ,  $Ar^4$  and  $n$ . Regardless of what specific groups are selected for the other six variables of Kreuder's formula (I), Kreuder's polymers will meet the limitations of a polymer comprising a repeating unit of present formula (1) when Kreuder's  $Ar^2$  and  $Ar^4$  are either of the two formulae at c. 6, l. 25-31 and Kreuder's  $n$  is 1.

With respect to the rejection under 35 U.S.C. 103(a) based on Woo et al., applicant argues that Woo does not teach a concrete example where "b" of Woo's formula (II), (III) or (IV) is 3, and does not teach the specific carbon positions of the substituents as in present claim 1. These arguments are not persuasive. A specific example of a polymer according to Woo et al. in which "b" is 3 is not required in order to render the present claims obvious. Regarding the

Art Unit: 1774

specific carbon positions of the three substituents, there are only six different arrangements possible for three  $R^3$  substituents on a phenyl group as in Woo's formula (II), (III) or (IV), and one of those six arrangements meets the limitations of (C) in present claim 1 and is a group having the substitution pattern shown in formula (3) in present claim 4.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
April 16, 2007



MARIE YAMNITZKY  
PRIMARY EXAMINER

1774